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EXECUTIVE SUMMARY
of a
PROPOSAL
to
DESIGN, FINANCE, CONSTRUCT, AND OPERATE
a
MATERIALS RECOVERY/WASTE CONVERSION FACILITY
for the
CITY OF BERKELEY, CALIFORNIA

October 15, 1982



BANYAN CORPORATION

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1. INTRODUCTION

Sanjour Resource Recovery, Inc. (SRR), a Texas corporation, qualified to conduct business in the State of California and its affiliates, Sanjour Technology Corporation (STC) and Sanjour Environmental Services, Inc. (SES), are submitting this report to the City of Berkeley in response to the City's Request for Proposal (RFP) for a solid waste-to-energy facility. The RFP was issued on 10/1/93 and the deadline for proposals was 11/1/93. The City of Berkeley is the owner of the facility.

This proposal is a preliminary response to the City's Request for Proposal. The City is requesting that the City of Berkeley provide the City with a preliminary response to the City's Request for Proposal. The City is requesting that the City of Berkeley provide the City with a preliminary response to the City's Request for Proposal.

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The applicant will be required to provide a detailed response to the City's Request for Proposal. The City is requesting that the City of Berkeley provide the City with a detailed response to the City's Request for Proposal. The City is requesting that the City of Berkeley provide the City with a detailed response to the City's Request for Proposal.

SRR Management feels that the proposed facility for Berkeley will be of long-term benefit to the community by:

- providing waste disposal costs
- saving space and use of the community
- recovering valuable materials through recycling
- providing low cost electrical energy in the absence of Berkeley City's conversion of a waste product to energy.

I. INTRODUCTION

Banyan Resource Recovery, Inc. (BRR), a Texas corporation, qualified to conduct business in the State of California, and its affiliate, Banyan Technology Corporation (BTC), propose to design, finance, construct and operate for a period of 20 years, a 400 ton per day materials recovery/waste conversion facility (MR/WCF) for the City of Berkeley.

This proposal has been prepared in response to the City's Request for Proposal dated October 1981 with modifications through negotiations with the City during the past five (5) months.

BRR currently has a 500 ton per day (two-shift basis) materials recovery facility operating in Dade County, Florida. The Dade County facility, which is available for inspection by the City of Berkeley, was designed, financed and constructed by BRR in 1981. A photo of the facility is included in Section VIII. That facility is similar to the one proposed for Berkeley. It presently recovers corrugated paper, ferrous metals, aluminum, color-sorted glass and refuse-derived fuel (RDF). Plans are now underway to design, finance, construct and operate an energy recovery module at the Dade County facility by mid-1983 using the same energy recovery technology as proposed for Berkeley. At Dade County, the energy recovery will consist of a gasifier to utilize RDF feed which will produce a low BTU gas suitable for use in a dual-fuel engine generator to produce 8 megawatts of electrical energy.

The approach to be taken in Berkeley is similar except that nine megawatts of electrical output will be generated while producing 10,000 to 15,000 pounds per hour of steam for sale to a nearby industrial facility.

BRR management feels that its proposed facility for Berkeley will be of long-term benefit to the community by:

- minimizing waste disposal costs
- adding funds and jobs to the community
- conserving valuable materials thru recycling
- providing low cost electrical energy to the citizens of Berkeley thru conversion of a waste product to energy.

The facility as proposed will minimize environmental problems which normally result from refuse disposal and landfilling. This process is inherently more efficient and less polluting than a mass-burn incineration type facility. Because the process gas is cleaned before using in an internal combustion engine, environmental emissions are limited to products of combustion similar to natural gas, which is one of nature's cleanest burning fuels.

II. COSTS

A. Cost to the City

Banyan Resource Recovery will design, build and operate the materials recovery/waste conversion facility at no initial capital cost to the City. The City will pay to BRR a fee of \$210,000 per month at a level of 6,000 tons per month or less of refuse received and processed. When the amount of refuse exceeds 6,000 tons per month, payment per ton of refused received will decrease. At a level in excess of 9,000 tons per month, the payment for the first 6,000 tons per month will be \$150,000 per month.

A tipping fee of \$25.00/ton will be paid by the City for all tons above 6,000 tons per month. The tipping fee will escalate with the consumer price index, while the base payment level will not.

Above 12,000 tons per month of refuse received, Banyan will provide a revenue sharing program with the City that pays to City 50% of all revenue above a base level. The revenue sharing is structured to permit BRR to recover its capital and operating costs and then share additional revenue with the City to help bring down the City's cost of refuse disposal.

The revenue sharing will be provided from:

- (a) 50% of all materials recovery revenue above 5.00 per ton of residue processed
- (b) 50% of revenue from electricity sales above a base level that permits BRR to recapture its capital and operating cost

With both revenue sharing provisions, the net cost to the City could likely fall below \$100,000 per month for the first 6,000 tons per month of refuse processed.

B. Capital and Operating Costs

The 400 TPD facility, as proposed, is estimated to have an installed capital cost of \$17.5 million in 1984 dollars. Of this amount, approximately \$5.0 million is for the materials recovery portion. Operating Expenses in 1985 are estimated to be \$4.4 million. Of the operation amount, more than \$1.4 million is for labor and fringe benefits for total facility operation. Approximately 40 new jobs will be created beyond those required for the transfer station operation.

C. Financing

During the design and construction phase, Banyan Technology Corporation will provide interim funds from its internal cash flow, supplemented by bank loans. Banyan Technology is currently going through an equity offering to raise \$10,000,000. The sole purpose of this offering is to provide interim construction funds for projects such as Berkeley.

A limited partnership would be structured to provide permanent financing for the Berkeley Project. Total project financing would encompass approximately 50 percent equity and 50 percent debt.

Prior to signing the final contract, Banyan Technology Corporation will assure itself and Berkeley of the sufficiency of funds to complete construction with the interim financing in place. Due to the changing nature of the financial markets, the Company must constantly make provisions for alternative financial arrangements. An alternative would be for Banyan Technology Corporation to be the equity contributor and securing long-term debt collateralized by the plant.

III. DESCRIPTION OF THE FACILITY

The facility, as proposed, will accept 400 TPD of refuse by way of the transfer station and will separate the material in the following components:

- Corrugated Paper
- Ferrous Metals
- Aluminum
- Color-sorted Glass
- Refuse-derived Fuel (RDF)
- Process Residue

The first four components will be produced in suitable form to be sold while the RDF will be used as feedstock for an Omnifuel Fluidized-Bed Gasifier. The materials recovery portion of the facility will operate one (1) shift per day, seven (7) days per week while the energy recovery (waste conversion) part of the facility will operate three (3) shifts per day, seven (7) days a week.

The Omnifuel Gasifier will generate a low heat value (150 BTU/SCF) gas which will be cleaned in a Hydro-Sonic Systems' gas scrubber prior to firing in modified diesel engine-generator, for electric power production. In addition, waste heat will be recovered in the form of steam to be sold to local industry. All process residue and gasifier residue will be hauled to landfill for disposal.

Figure I indicates the flowsheet for the facility. Recovery of various components from a 400 TPD input on an annual basis utilizing the 1980 compositional data developed by the City is estimated as follows:

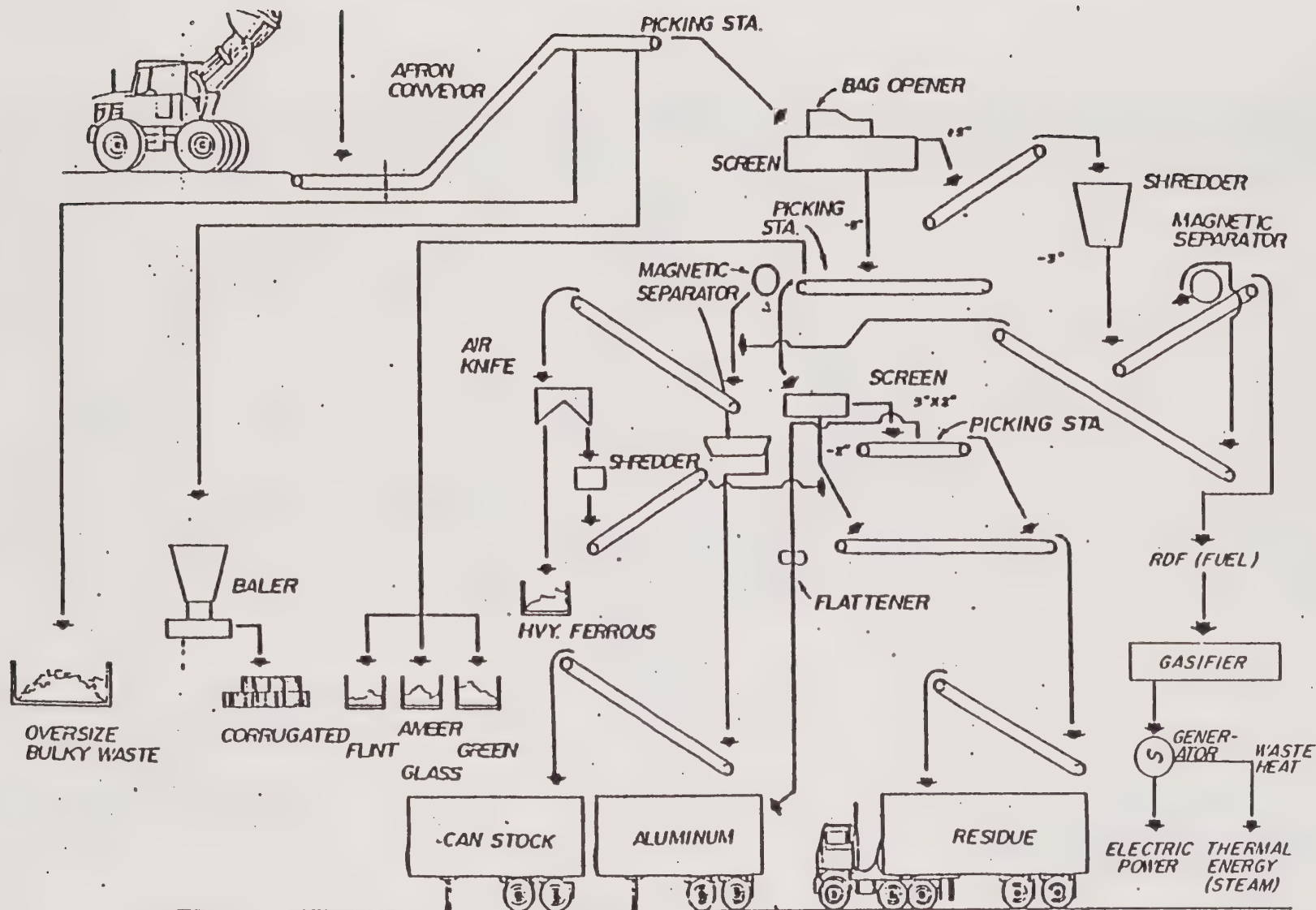
Corrugated Paper	1400 tons
Ferrous Metals	4300 tons
Aluminum	690 tons
Color-Sorted Glass	6500 tons
Electric Power	9 MW (66 Milion KWH)
Steam	60 Million pounds

On the basis of the product marketing experience at Banyan-Dade, BRR management expects no problems with marketing material recovered from the Berkeley refuse. Electric power will be sold to Pacific Gas and Electric while steam contract negotiations will be conducted with Cal Ink.

The following are materials markets as presently known:

Corrugated Paper	Consolidated Fibers, Inc. Richmond, CA
	Crown Zellerbach Antioch, CA
	Louisiana Pacific Antioch, CA
Ferrous Metals	Proler International Stockton, CA
Aluminum	Aloca Recycling Corp.
	Reynolds Recycling Corp.
Glass	Owens-Illinois, Inc. Oakland, CA
	Circo Glass Newark, CA
	Brockway Glass Company Oakland, CA
	Glass Container Corporation Hayward & Antioch, CA

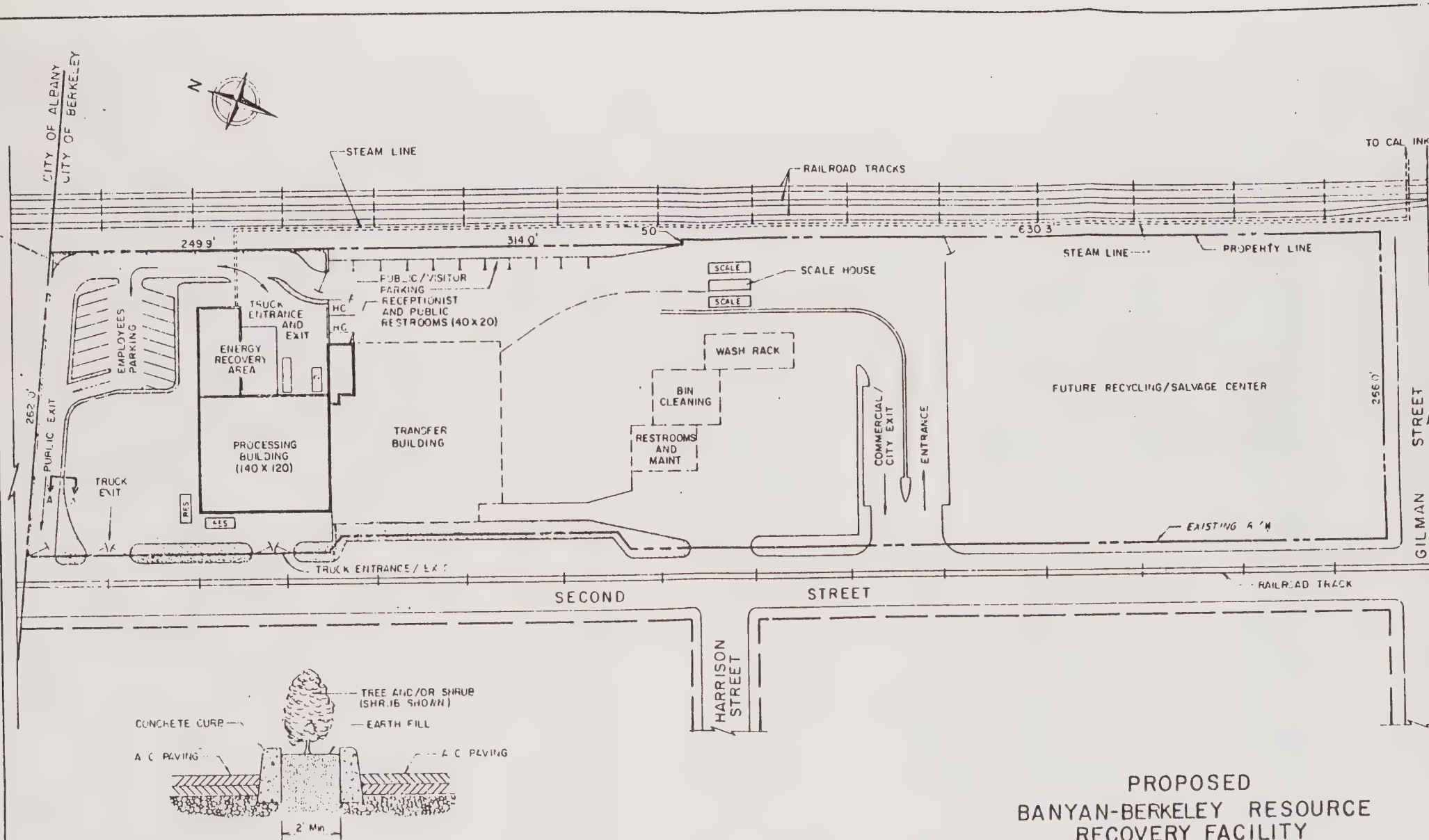
The facility site plan as shown in Figure 2 indicates the MR/WCF to be located to the north of the Receiving/Transfer Station facility. The Administration Area has been incorporated into the material recovery portion of the facility in order to minimize land use requirements, construction costs, provide better operations management and to provide better viewing by visitors. The Administration area utilizes a small portion of the northeast corner of the R/TS facility and a mezzanine installed in the south end of the MR facility.



BANYAN RESOURCE RECOVERY

PROCESS FLOW SHEET

FIGURE 1



SECTION A-A

FACILITY PLAN

1/8" = 10'

PROPOSED BANYAN-BERKELEY RESOURCE RECOVERY FACILITY

PREPARED BY
BANYAN RESOURCE RECOVERY, INC.
FOR
CITY OF BERKELEY, CALIFORNIA

The waste conversion facility including RDF storage, gasifier, gas cleaning and cooling as well as the engine generator lies to the east of the MR facility and away from the street area.

IV. INTERFACE WITH RECYCLING

The City of Berkeley has set a goal of 50 percent recycling. The implementation of the BRR system with its frontend materials recovery system will help achieve that goal. The material recovery plans call for the recovery of corrugated paper, ferrous metals, aluminum and glass. In addition, the facility is designed in such a manner that additional materials may be recovered should markets warrant. Recovery of additional materials such as newspaper, rags, high density polyethylene plastic bottles and PET plastic bottles can be readily implemented.

It is also the desire of BRR management to work closely with the community recycling center already on-site to maximize the return from recovered materials. Prospective benefits thru cooperation would be freight savings, achieved with larger quantities of material, as well as higher prices as a result of a higher volume of materials.

BRR will guarantee the City a 50 percent weight reduction of refuse of the first 200 tons per day processed thru the WR/MCF. The objective is to process a minimum of 400 tons per day with a result of 50% weight reduction of the entire amount.

V. AIR EMISSIONS

Air emissions will be minimized due to the process being used and air cleaning steps incorporated into the process. The gasification of RDF provides an inherently cleaner off-gas than does mass-burning. The gas is cleaned between the gasifier and internal combustion engine, prior to its use. The internal combustion engine emits a small amount of NO_x, in the amount of six grams per hour per engine horsepower. The remaining exhaust stream is carbon dioxide, water vapor, and small amounts of complex hydro-carbons, and other products of combustion.

VI. GENERAL ENVIRONMENTAL CONSIDERATIONS

As part of the facility design and permitting process, BRR management intends to contract with Environmental Science Associates, Inc., (ESA) of San Francisco and Foster City, California, to evaluate the setting and potential environmental impacts of the project. Mitigating measures will be developed to reduce any potential impacts.

The impacts and issues associated with the project which are to be examined are; air emissions, odor, noise, visual effects, dust, vectors, storm drainage, litter and wastewater disposal. Based on the previous experience of ESA and BRR, we are certain that all impacts and issues can be minimized or resolved in accordance with all applicable regulations in order to assure a beneficial, long-term, environmentally acceptable operation.

VII. HIGHLIGHTS OF CONTRACT TERMS

The basic contract terms provide for a 20-year operation of the proposed facility by BRR. The cost to the City of refuse disposal will decrease, with increases in tonnage of waste processed and the City will share in the revenue of the recovered materials and energy generation, above a base amount.

BRR will guarantee the volume reduction of refuse processed of 36,000 tons per year, or an average of 50% of the first 200 tons per day of refuse processed through the facility.

BRR will work with the Community Recycling Center to provide the most efficient marketing of recovered materials. The recycling center will have the first right of refusal to purchase recovered materials from BRR, should they so desire.

VIII. EXHIBITS

1. Photograph of Banyan-Dade Facility
2. Abstract of Report Entitled "Technical Evaluation of Wood Gasification", prepared by Synthetic Fuels Associates, Inc., for Electric Power Research Institute (EPRI), August 1982.

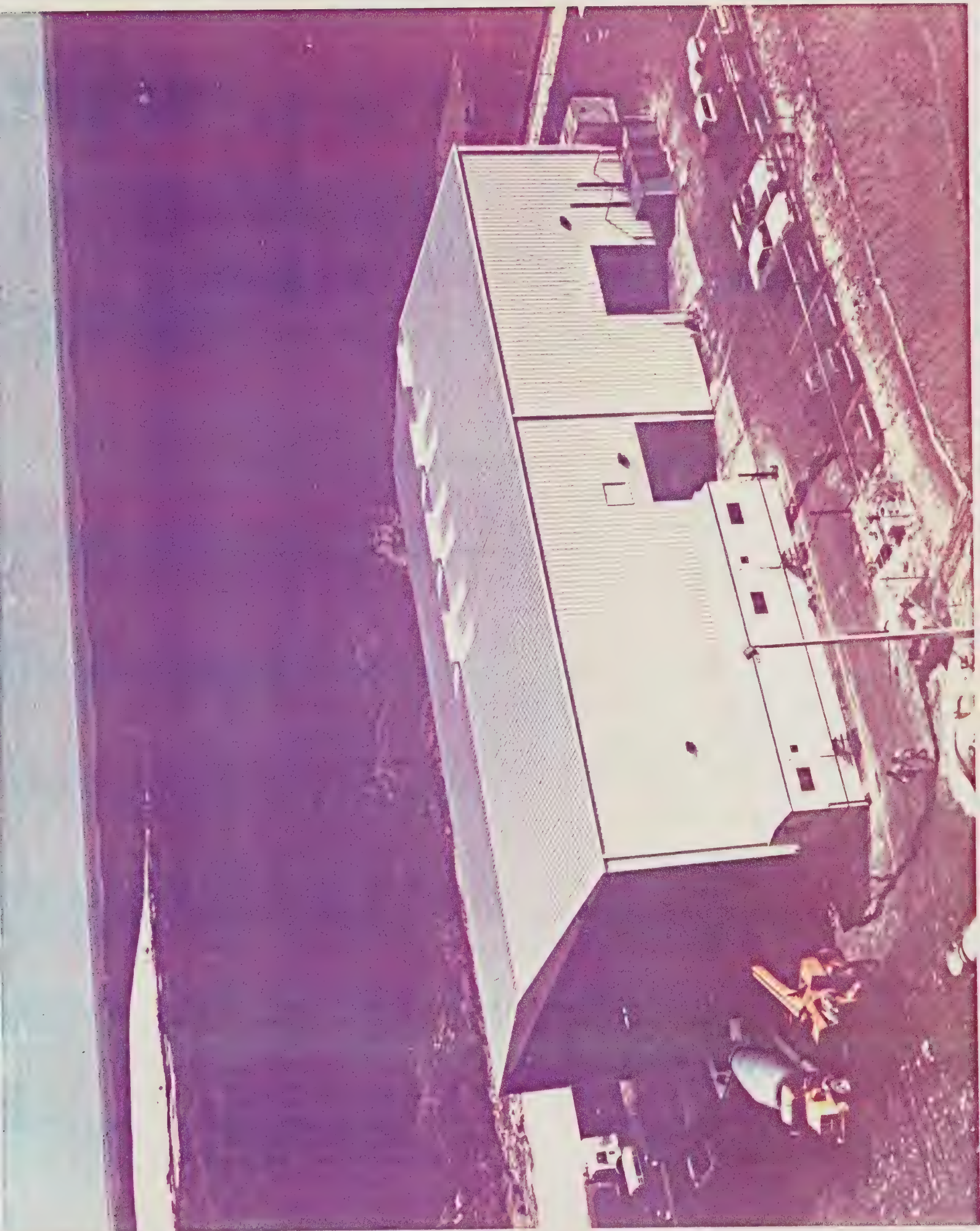


EXHIBIT II

ABSTRACT OF TECHNICAL EVALUATION OF WOOD GASIFICATION

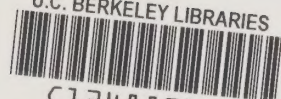
Prepared by
Synthetic Fuels Associates, Inc.
for
Electric Power Research Institute

Gasification of biomass (wood, wood waste, agricultural residues, etc.) is an often-discussed option that may permit utilities to obtain a portion of their fuel requirements from renewable resources. However, the technical state of this option is unclear at present, and this study was initiated to provide documented performance information of commercial biomass gasifiers to the electric utility industry.

Biomass gasification was to be assessed in terms of operability and technical performance by investigating installed commercial gasifiers. Only one gasifier installation, the Omnifuel gasifier at Hearst, Ontario, met the criteria selected to identify commercial installations able to provide operating data for engineering analysis. Although the data contained gaps and inconsistencies, a reasonably consistent picture of gasifier operation was derived. The gasifier was observed to be responsive to controls, but no long-term operating and maintenance data were available. Thus, biomass gasification is an emerging technology with potential applications, but the technical performance of large-scale gasifiers is not yet fully defined.

The full report developed by the Electric Power Research Institute is available from BRR should a reader want to examine it.

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